

AL-11495  
C-2



SPRING 1998

# THE ENGINEERING IN AGRICULTURE NEWSLETTER

CANADIANA

JUN 3 1998

## Is It Time For A Farm Building Code for Alberta?

Dennis Darby, Farm Structures Engineer, Lethbridge

This was the question discussed this winter by a representative group of builders, suppliers, insurance and lending industries, and farm representatives. The proposed code, based on the *National Farm Building Code of Canada* (NFBC), would require farm structures to be designed for climatic loads (wind and snow), product loads, and standards for fire and operational safety.

### Why the concern for a Farm Building Code?

Farm buildings are getting larger and more complex. In Alberta, farm buildings have always been exempt from the structural requirements of building codes. Concerns have been expressed by both the public and the building industries.

There have been several farm structure failures due to the lack of proper design. For example, the truss roof system is usually engineered, but the wind bracing, pole supports, foundations, and connections are often not. Improper or missing roof truss bracing has been a major cause of building failures. Farm buildings should be marketed as meeting minimum standards for snow, wind, and product

### The main criteria for a FBC

- It is practical.
- Easy to administer.
- Treats farm buildings fairly.
- Allows design by a handbook or standard plans.

loads to avoid unfair competition and assure the buyer of quality and reliability.

### What are the implications of a Farm Building Code?

Implementing a Farm Building Code would impose the following requirements:

1. A building permit, as is now the case for residences on farms.
2. Design details, including plans.
3. Large projects will require an "Engineer of Record" responsible for the whole project.
4. Heavily loaded structures will require a foundation design, probably requiring soil testing and professional engineering services.
5. Building inspection, by a private building inspection service or by the Engineer of Record, if one is involved in the building design.

(continued)



Printed on Recycled Paper

The purpose of this newsletter is to advise of activities and projects being conducted by Alberta Agriculture, Food and Rural Development's Engineering Services and Regional Agricultural Engineering staff. For further information on these projects and other engineering related activities contact:

Lethbridge  
Red Deer  
Barrhead  
Edmonton (Eng. Services)

381-5112  
340-5322  
674-8256  
427-2181

Airdrie  
Vermilion  
Fairview  
Lethbridge (AFMRC)

948-8525  
853-8224  
835-2291  
329-1212

Published by Engineering Services, Rural Development Division, Alberta Agriculture, Food and Rural Development



The review committee endorsed this proposal provided that the Farm Building Code would meet the following criteria:

- Practical in its dealings with farm buildings.
- Easy to administer.
- Allow simpler and smaller buildings to be designed from a "handbook approach" or from standard plans provided by government or pre-engineered building packages, like the present code for residences and small buildings.
- Provide for inspections by either a building inspector or the Engineer of Record.

The adoption of a Code for Farm Buildings is a lengthy process that would evolve through extensive consultation with those most affected; farmers, builders, and building officials. Anyone wishing the full discussion paper, or with opinions to share with the review committee, should contact Dennis Darby, P.Eng., Farm Structures Engineer at (403) 381-5821 or e-mail from this web site.

---

## Spring Maintenance for Your Water System

*Ken Williamson, Agricultural Water Specialist, Red Deer*

Spring is here and it's time to start thinking about well and water system maintenance. Here is a short check list of items that you may want to deal with on your farm before other spring work gets into full swing.

### 1. Shock chlorinate your well.

Iron and sulfate bacteria are the most common well problems. They cause iron staining and produce a "rotten egg" odour in the water. Controlling them usually involves shock chlorinating your well twice a year and spring is a good time to do this. A fact sheet and video explaining the procedure are available at any of Alberta Agriculture's offices.

### 2. Recharge the air in your pressure tank.

A properly operating pressure tank protects your pump from turning on and off every few seconds. A pressure tank contains compressed air and water. In many tanks, the air becomes absorbed into the water, causing a "waterlogged" condition. This

causes the pump to kick on and off every time a small amount of water is used. The constant on and off cycles will damage the pump motor.

### 3. Check the well pit.

Well pits can be major routes of well contamination, especially during spring runoff. Many pits get partially filled with surface water or shallow groundwater in the spring. If this is the situation, you can protect yourself by:

- replacing the pit with a pitless adaptor,
- making sure that you have a sump pump in the pit to keep it dry,
- make sure that you have a sanitary well seal on the top of the casing.

Locating a well in a well pit was banned in 1993, under the *Alberta Environmental Protection and Enhancement Act*. Many older wells are still located in pits and have a high potential for contamination.

### 4. Watch for any deterioration of water quality during spring runoff or heavy rains.

If your well water becomes murky in the spring, it could be due to a poor well casing seal or another old well in the yard. Either one can allow runoff to get into the aquifer and contaminate the well. Old, unused wells should be properly plugged to prevent groundwater contamination.

---

## Dairy Barn Plan Development

*Robert Borg, Agricultural Engineer, Red Deer*

When farmers plan dairy facilities, it is useful to look at many alternatives. Books of layouts and plans are a great source of ideas; however, they must be based on practical experience and existing projects. The development of a layout starts by working with individual farmers and farm builders. The cumulative knowledge gained by working on several barn plans is a necessary part of developing good engineering extension materials.

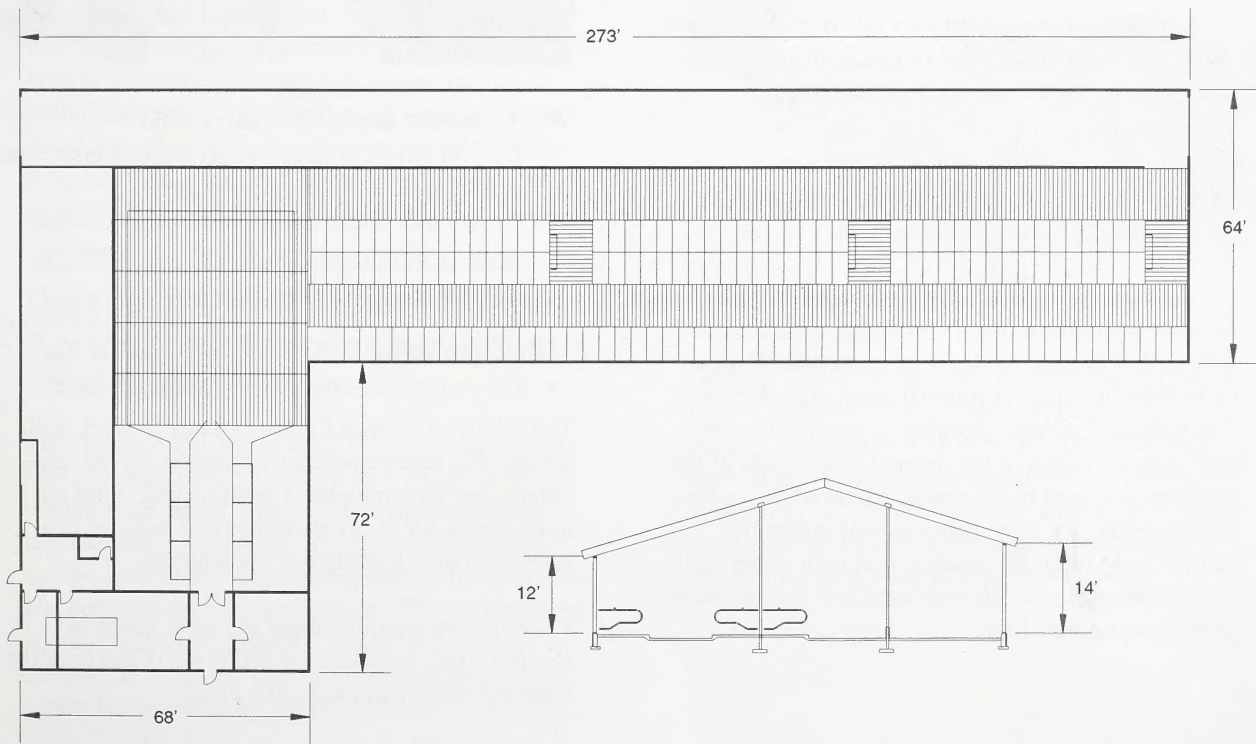
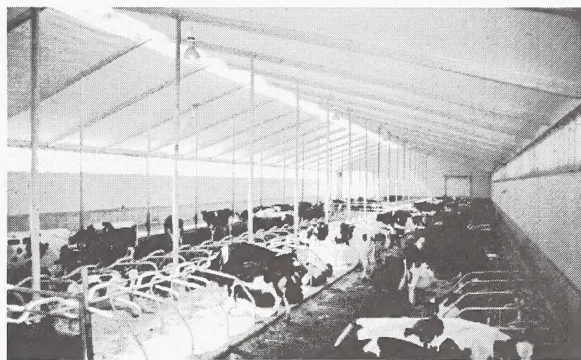
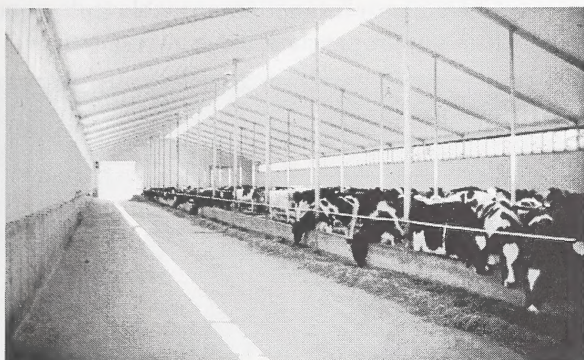
In this example, the Appel family of Spruce Lane Dairies, located near Red Deer, brought their ideas into Alberta Agriculture. Using CAD (computer-aided design) tools, the farmer was able to imple-



ment his ideas, facilitated by the engineer's design experience, to develop a 150 free stall dairy layout. The barn features a slat floor manure system, natural ventilation, a double six parallel parlour, a spacious milk house, and office area. At the same time, the farmer was able to incorporate ideas from farm builders. An innovative feature of this barn is post and beam construction, utilizing Westlam structural lumber supplied by Western Archrib. Gordon Blades, of UFA Coop in Red Deer, was responsible for this part of the design. The result is a very pleasing, open and bright barn interior.

Ventilation rates were based on 30 years of Red Deer weather data and calculated using Natvent, a natural ventilation software package developed through research funded by Ontario Agriculture (verified with Alberta Research). This research is still the only existing study of wind effects on buildings with openings.

This type of engineering development work is a good example of how one individual project adds to the experience necessary to develop a collection of barn plans and layout ideas that will benefit the next farmer in designing a new dairy facility.





## Paddle Wheel Pumping Unit

*Darryl Slingerland, Project Engineer, AFMRC, Lethbridge  
Vic Brown, Prairie Farm Rehabilitation Administration, Lethbridge*

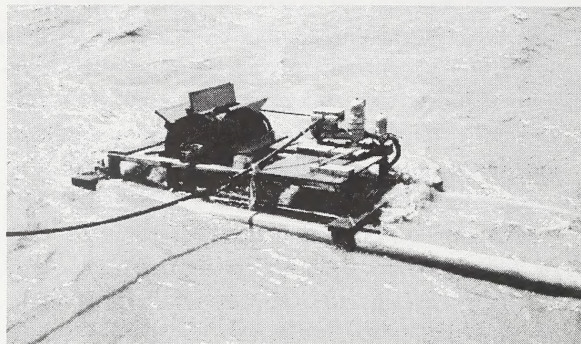
Farmers and ranchers have traditionally let cattle help themselves to water from a creek or dugout. Recent studies show that this practice is not environmentally friendly, and is in fact, costing the producer money. Allowing cattle to wade into the water source is damaging, causing bank erosion, muddied water, and a source of pollution. The economic factor has been highlighted by several studies which show cattle gain more weight by drinking clean water out of a trough rather than straight from the water source.

Many producers agree that it is a good idea to fence off the water source and pump water to the cattle. In many cases, the pasture and water source are remote, with no available electrical service. The only real alternatives have been wind-driven or solar powered pumping units. Both of these options are relatively expensive. Now, there is another alternative. For any producer with a creek, or other running water source, the "Paddle Wheel Pumping Unit" is an inexpensive way to protect the water source and pump water to cattle.

The original idea came from Orrin Hart, a Claresholm area rancher, who built a prototype unit and used it on his ranch with excellent results. With his permission, the Prairie Farm Rehabilitation Administration (PFRA) contacted AFMRC to build a demonstration unit.

The basic principle is to use the power of flowing water to turn the paddle wheel, which belt drives a pump. The unit consists of two pontoons, which enable the unit to float on the water surface, with a frame to hold the pontoons in place. The paddle wheel is placed on the back half of the frame, between the pontoons. The pump is mounted on a platform on the front half of the frame, and must be

able to slide to tighten the drive belt. The unit is held in place by an anchor, or by a rope attached to the banks on either side.



From our experiments, we have determined that for the paddle wheel pumping unit to work, the source of flowing water must meet the following requirements.

1. A minimum depth of six inches
2. A minimum width of three feet.
3. A minimum current of two feet per second.

This unit can be made from items most farmers or ranchers have laying around their shop. Irrigation pipe, flattened at both ends and welded closed, works well for the pontoons. The pump must be a positive displacement type pump which turns quite easily. Depending on the number of parts that have to be bought, the total cost should be between \$300 and \$400. The labour requirements to build it should be less than two days.

A draft copy of the fact sheet has been completed, and after review by PFRA, will be finalized and made available. PFRA is continuing its research to try to come up with a paddle design and pump that will allow the unit to operate in water sources with lower currents, thus increasing the number of sites where it can be used. They are planning to demonstrate the unit at several of their sites this summer.



***We're on-line! Visit us at:***

*[www.agric.gov.ab.ca](http://www.agric.gov.ab.ca)*





## Financial Assistance Program For Agricultural Processors

*Marshall Eliason, Farm Machinery Engineer, Edmonton*

The Agricultural Value-added Engineering Centre's (AVEC'S) Financial Assistance Program for Agricultural Processors was officially launched on September 8, 1997. Since then, numerous project applications have been received. To date, three projects have been approved for a total of \$50,500 in grant money. They are:

- Alberta Market Gardeners Association: Design, Testing and Comparison of Direct and Indirect Ice-to-Air Forced-Air Coolers.
- Dr. Ken Domier, University of Alberta: Utilization of Hemp for Building Panels
- Dr. Kevin Swallow, Food Processing Development Centre: Value-added Conversion of Barley to Levulinic Acid - Process, Development and Product Use

AVEC's Financial Assistance Program is intended to promote the growth of Alberta's agricultural value-added processing industry in an environmentally responsible manner by providing engineering support for the development and adoption of innovative technologies, systems, and facilities. Assistance is available to companies, organizations or individuals requiring engineering support for the development of agricultural processing industries. Program guidelines and further information can be obtained by calling (403) 427-8764.

## Database Development for the Agricultural Processing Industry

*John Kienholz, Industrial Technologist, Edmonton*

The Agricultural Value-added Engineering Centre (AVEC) is currently developing a database of commercial information. It includes companies representing: processing equipment, chemicals, safety, packaging, engineering and building materials, consultants, and contractors. This information is compiled from company literature contained in the AVEC Resource Centre. The database is currently being tested by AVEC staff who can assist

clients with finding information. It will be available to the rest of Alberta Agriculture staff this summer.

The Resource Centre is also compiling a searchable set of Internet bookmarks for the agricultural value-added industry. Other plans include the development of a database of technical information for engineering in the agricultural value-added industries.

---

## Upcoming Field Days

*Murray Green, Farm Machinery Engineer, Airdrie*

Direct seeding equipment and techniques are the main focus for numerous Field Days and demonstration/diagnostic sites being planned. Several features of direct seeding will be showcased at a demonstration site east of High River, approximately one kilometre west of Frank Lake, on Highway 23. Specialists will be on hand for tours on June 15 and again on July 8, 1998.



On July 7, a Field Day will be held west of Red Deer's 32nd Street overpass. More than 10 direct seeding planters will be at work, alongside the crops each of the machines planted in May. Various companies will also be on-site, staging more trials. It's a great chance to speak with agricultural specialists and exchange ideas with other farmers.





## Water Wells.....that last for generations

Bob Buchanan, Agricultural Water Specialist, Barrhead

The new, updated version of *Water Wells....that last for generations* is now available in District Agriculture offices across the province. Copies of this **free** publication are also available from the Agricultural Water Specialists located in Barrhead and Red Deer.

The 90-page water well manual was designed to provide rural people with some basic information on groundwater resources and wells. It is intended to assist people in making wise decisions in planning water wells, or troubleshooting problems with older wells. Over the years we have found that a lack of understanding of groundwater and wells has led to many wells failing prematurely. This manual contains 12 modules designed to assist people in understanding the factors which affect groundwater supply and quality, along with the requirements of a properly designed and constructed well. Modules to help well owners better manage, maintain, and protect their wells are also included.

Three videos which accompany this manual are also available for rental from all of our District Agriculture offices. The names of the videos are:

### Water Wells That Last

<b>Part One</b>	Planning and Construction
<b>Part Two</b>	Managing and Maintaining
<b>Part Three</b>	Shock Chlorination

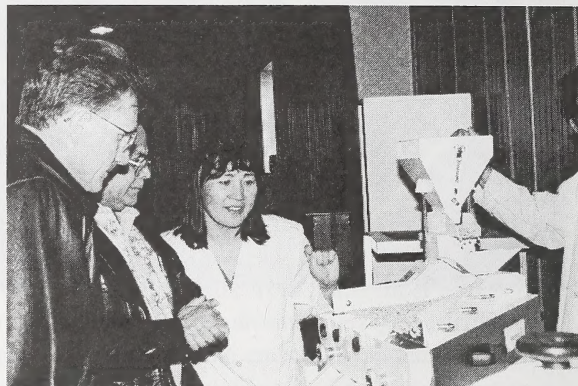
The manual and videos were jointly produced by Alberta Agriculture, Food and Rural Development, Alberta Environmental Protection, and the Prairie Farm Rehabilitation Administration. The Alberta Water Wells Drillers Association provided assistance with revisions to the manual. On behalf of the agencies involved in the development of this information series, we hope that you will utilize the manual and videos in ensuring that your water wells last for generations. We welcome any comments or questions you may have.

## AVEC Open House

Agricultural Value-added Engineering Centre, Edmonton

You are cordially invited to the opening of the Agricultural Value-added Engineering Centre's Research Centre on Friday June 5, 1998. It is located approximately 1.2 km south of Ellerslie Road on 127th Street in Edmonton.

- Viewing of facilities, equipment and displays from 1:30 to 5:00 p.m.
- Opening ceremonies - 2:00 p.m.
- Representatives from associated agencies will be on hand.
- AVEC Specialists will be available to describe details of the program and answer questions.



### What does the Research Centre offer?

- Do you have a processing problem or issue that can be addressed through research?
- Do you need help improving a piece of equipment or developing an idea into a commercial product or service?
- Do you need help with an agricultural processing project?
- Do your processing clients need assistance?

The AVEC Research Centre is ready to work with processors, researchers, agri-business service providers, and government extension staff. Find out more about AVEC's capabilities and how we can assist you by attending our open house.

For more information about the open house or about AVEC, contact us at (403) 427-8764 or at the Research Centre at (403) 415-2682.